

**Remarks:**

The Office Action mailed October 13, 2005 has been received and reviewed. By the present Response and Amendment, Applicant has (i) amended Claims 1, 2, 9, 15, 16, 20-24, 29-31, 33-43 and 49, and (ii) canceled Claim 28, without prejudice. No new matter has been introduced by virtue of the amendments to Claims 1, 2, 9, 15, 16, 20-24, 29-31, 33-43 and 49.

First, the Office Action rejected Claim 38 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. In support of this rejection, the Office Action states that “the applicant discloses heterodyne reception where active path length stabilization is not needed, but does not disclose heterodyne reception where active path length stabilization is used on one of the paths of the interferometer.” Responsive thereto, Applicants respectfully traverse the Office Action’s rejection of Claim 38, but have nonetheless amended Claim 38 to more clearly claim that active path length stabilization is useable on one of the paths of the interferometer. Supporting this amendment, Applicants note that at page 18, lines 12-13 in describing an embodiment including heterodyne detection, the specification more accurately states that “an advantage to this embodiment is that active path length stabilization may not be needed.” Notably, however, this statement does not assert that active path length stabilization cannot be used. Instead, the statement merely says that active path length stabilization may not be needed, thereby implying that active path length stabilization may, indeed, be needed and, hence, useable with heterodyne reception. Therefore, Applicants submit that Claim 38 is allowable as amended.

Second, the Office Action rejected Claims 15, 16, 31, 33, 41, and 43 under 35 U.S.C. §112, second paragraph, “as being indefinite for failing to particularly point out and distinctly claim the subject matter which application regards as the invention.” In response, Applicants have amended Claim 15 to provide appropriate antecedent basis for the term “reference frequency”. Applicants have also amended Claims 16, 31, and 41 to remove references to the variable “n”, thereby eliminating any indefiniteness resulting from such references. Additionally, Applicants have amended Claims 33 and 42 to remove the limitation “each channel”, thereby resolving the insufficient antecedent basis identified by the Office Action. Accordingly, allowance of Claims 15, 16, 31, 33, 41, and 43 is respectfully requested.

Third, the Office Action rejected Claims 1, 9, 18, and 20-23 under 35 U.S.C. §102(e) “as being anticipated by Hung (U.S. Patent Application Publication No. 2004/0008989).” In response, Applicants respectfully traverse this rejection of Claims 1, 9, 18, and 20-23, but have nonetheless amended Claims 1, 9, 18, and 20-23 in order to more clearly claim Applicants’ invention. Applicants note that Hung appears to disclose a method of communicating a plurality of optical signals that are phase multiplexed to form a combined optical signal that is transmitted on a single optical path. In a first embodiment disclosed by Hung, signals appear to be frequency multiplexed and wavelength multiplexed prior to transmission on a single optical path. Notably, no signal delaying seems to be described in connection therewith. In a second embodiment disclosed by Hung, signals seem to be similarly frequency and wavelength multiplexed, but they are additionally phase multiplexed prior to transmission on a single optical path. As stated in Paragraph 0047 of Hung, “the second embodiment utilizes phase modulated and delayed optical signals and defines each optical channel by a wavelength multiplex, a phase delay or coherence multiplex and a frequency multiplex.” Thus, in Hung’s second embodiment, it is the delay between phases of an optical wavelength that seems to be employed with frequency and wavelength multiplexing to form a combined optical signal for transmission.

In contrast, Applicants’ method comprises the time delay and time multiplexing of a plurality of signals to form a combined optical signal that is transmitted on a single optical path. In an embodiment of Applicants’ method, signals are frequency modulated by frequency modulators in a coherence multiplexer unit using different modulation frequencies onto input optical signals having a particular, single wavelength to produce modulated optical signals. Of course, other forms of modulation may be utilized as disclosed by Applicants to impose data on optical signals and Applicants’ method is not limited to frequency modulation. The modulated optical signals are next time delayed relative to one another by delay loops present in the optical signal paths of the modulated optical signals. The time delayed, modulated optical signals are then combined by a combiner to produce an output optical signal comprising time multiplexed, modulated optical signals. Other output optical signals are similarly produced by other coherence multiplexer units using input optical signals having different wavelengths. The output optical signals of the various coherence multiplexer units having different wavelengths are then multiplexed by an optical DWDM multiplexer prior to transmission on a single optical path.

Notably, Applicants' method does not employ phase modulation and delay as appears to be disclosed by Hung. Instead, Applicants' method utilizes time delay to time multiplex optical signals that have been modulated with data in order to produce an optical signal having a particular wavelength that is then multiplexed with other similarly produced optical signals having different wavelengths. Therefore, importantly, Applicants' method does not include phase modulation and delay as disclosed by Hung. As a consequence and unlike Hung, Applicants' invention does not suffer from the modulo  $2\pi$  problem. To better clarify this distinction between Applicants' method and the disclosure of Hung, Applicants have amended Claim 1 to more clearly claim that Applicants' method utilizes time multiplexing to produce a combined optical signal in which the time delays between included optical signals are due at least in part to the propagation time delays caused by the delay loops and path length differences of the interferometers. Applicants have also amended Claim 1 to remove the "wherein" clause related to modulation and to replace it with a more affirmative statement of the receiving and modulation step present in Applicants' method.

Regarding the Office Action's rejection of Claim 9 under 35 U.S.C. §102(e), the Office Action states that "Hung discloses the method of Claim 1, wherein the light source unit produces a singular output which is imaged into multiple optical fibers." Responsive thereto, Applicants note that Hung appears to disclose amplitude splitting of light from a laser source to distribute such light to multiple optical fibers. In contrast, in Applicants' method, wavefront splitting is employed to distribute light to multiple optical fibers. Thus, Applicants have amended Claim 9 to clarify this distinction and note that amended Claim 9 also includes the patentably distinct steps and limitations of independent Claim 1 by virtue of its dependency thereon.

With respect to the Office Action's rejection of Claim 18 under 35 U.S.C. §102(e), the Office Action states that "Hung discloses the method of Claim 1, wherein the modulator uses phase modulation." In response, Applicants note that Claim 18 includes the steps and limitations of amended Claim 1 by virtue of its dependency thereon. Thus, Claim 18 includes the use of time delays and time multiplexing of optical signals in addition to phase modulation of data onto optical signals. Because Hung does not appear to disclose this combination, Applicants contend that Hung does not anticipate Claim 18 under 35 U.S.C. §102(e) and, hence, Claim 18 is patentable as written.

In regard to the Office Action's rejection of Claim 20 under 35 U.S.C. §102(e), the Office Action states that "Hung discloses a method of ... multiplexing at the first site "M" signals to produce a single multiplexed signal, wherein at least one of the "M" signals has been coherently multiplexed and, optically transmitting a multiplexed signal to a second site." Responsive thereto, Applicants have substantially amended independent Claim 20 to more particularly and clearly claim that the optical signals having a common wavelength that are present in the transmitted wavelength division multiplexed optical signal are offset in time relative to one another (as described above with respect to amended independent Claim 1), thereby enabling Applicants' claimed method to achieve data throughput comparable to the method of the second embodiment of Hung without encountering the modulo  $2\pi$  problem inherent in Hung's method due to its use of phase modulation. Further, while achieving comparable data throughputs, Applicants' claimed method does not suffer from the degradation in signal-to-noise ratio that results in Hung's second embodiment due to the use of both frequency and phase modulation. The method disclosed in Hung's first embodiment cannot achieve that data throughputs produced by Applicants' claimed method of Claim 20. Therefore, for at least these reasons, Applicants submit that their method as claimed in amended Claim 20 is substantially superior to the methods disclosed by Hung, constitutes an improvement thereover, and is not anticipated or rendered obvious by Hung. Hence, Applicants respectfully request allowance of amended Claim 20.

Regarding Claims 21 and 23 and in support of the Office Action's rejection thereof under 35 U.S.C. §102(e), the Office Action refers to Fig. 10 and Paragraph 0054 of Hung in stating that "the step of multiplexing includes wavelength division multiplexing" and "the step of demultiplexing includes wavelength division multiplexing". Responsive thereto, Applicants note, respectfully, that Paragraph 0054 discloses only wavelength multiplexing and wavelength demultiplexing, and Fig. 10 only includes the word "wavelength". Neither Paragraph 0054 or Fig. 10 disclose any particular form of wavelength multiplexing or demultiplexing. Nonetheless, Applicants have amended Claims 21 and 23 to respectively claim that the wavelength division multiplexed optical signal comprises a dense wavelength division multiplexed optical signal and that the step of demultiplexing includes dense wavelength division demultiplexing. Additionally, Applicants note that amended Claims 21 and 23 depend either directly or

ultimately from amended independent Claim 20 and thus include all of the patentable steps and limitations thereof. Because neither Fig. 10 nor Paragraph 0054 of Hung disclose the use of wavelength division multiplexing and certainly not dense wavelength division multiplexing and because amended Claims 21 and 23 depend from amended independent Claim 20 which is allowable for the reasons described above, Applicants contend that amended Claims 21 and 23 are not anticipated or rendered obvious by Hung. Therefore, Applicants respectfully note that amended Claims 21 and 23 are allowable.

With respect to the Office Action's rejection of Claim 22 under 35 U.S.C. §102(e), the Office Action states that in Fig. 10 and Paragraph 0054, Hung discloses "the steps of demultiplexing at a second site the multiplexed signal into "M" signals, and directing at least one of the "M" signals to a coherent demultiplexing unit." In response and as noted above with respect to Claims 21 and 23, Paragraph 0054 of Hung discloses only wavelength multiplexing and wavelength demultiplexing, and Fig. 10 only includes the word "wavelength". Neither Fig. 10 nor Paragraph 0054 of Hung appear to disclose the demultiplexing of a received optical signal into coherence multiplexed optical signals including pluralities of optical signals that are offset in time relative to one another and have the same phase as is claimed in amended Claim 22. Also, Applicants note that amended Claim 22 depends from amended independent Claim 20 and, therefore, includes all of the steps and limitations thereof by virtue of such dependency. Hence, for at least these reasons, Applicants submit that amended Claim 22 is not anticipated or rendered obvious by Fig. 10 or Paragraph 0054 of Hung. Thus, Applicants respectfully request allowance of amended Claim 22.

Fourth, the Office Action rejected Claims 2, 13, 14, 29, 30, 44 and 45 under 35 U.S.C. §103(a) "as being unpatentable over Hung (U.S. Patent Application Publication No. 2004/0008989)." In response, Applicants respectfully traverse this rejection of Claims 2, 13, 14, 29, 30, 44 and 45, but have nonetheless amended Claims 2, 29, and 30, in order to more clearly claim Applicants' invention. Applicants again note with regard to Hung and as stated in Paragraph 0047 thereof, "the second embodiment utilizes phase modulated and delayed optical signals and defines each optical channel by a wavelength multiplex, a phase delay or coherence multiplex and a frequency multiplex." Thus, in Hung's second embodiment, it is the delay between phases of an optical wavelength that seems to be employed with frequency and

wavelength multiplexing to form a combined optical signal for transmission.. In contrast and as described more fully in reference to amended Claim 1 above, Applicants' method comprises the time delay and time multiplexing of a plurality of signals to form a combined optical signal that is transmitted on a single optical path. Applicants' method does not employ phase modulation and delay for this purpose. As a consequence, Hung's disclosure and use of phase modulation and delay (including the modulo  $2\pi$  and signal-to-noise degradation problems inherent therein) to form a combined optical signal for transmission teaches an entirely different method in a narrow field of art for increasing the data throughput in an optical communication network. Therefore, Hung actually teaches away from Applicants' better performing, more reliable, less complicated, and less costly method of accomplishing the same task and, hence, does not render Claims 2, 13, 14, 29, 30, 44 and 45 obvious under 35 U.S.C. §103(a).

Regarding Claim 2 and in response to the Office Action's specific rejection thereof under 35 U.S.C. §103(a), Applicants note that amended Claim 2 depends from amended independent Claim 1 and by virtue of such dependency, includes all of the steps and limitations of amended Claim 1. Thus, amended Claim 2 claims the optical splitting of a combined optical signal into "N" optical signals on "N" path pairs at a second site, where the combined optical signal includes optical signals respectively multiplexed in time relative to the other optical signals of the combined optical signal due at least in part to the propagation time delays caused by the path length differences of the signal arms of the interferometers. Also, the optical signals of the combined optical signal have the same phase as the other optical signals of the combined optical signal. As noted above, Hung teaches away from a combined optical signal comprising a plurality of time delayed optical signals as in Applicants' claimed method and, therefore, also teaches away from the optical splitting of such a combined optical signal. Thus, the steps and limitations of amended Claim 2 are not rendered obvious by Hung and amended Claim 2 is allowable.

In regard to Claims 13 and 14 and in response to the Office Action's specific rejection thereof under 35 U.S.C. §103(a), Applicants note Hung appears to disclose the use of  $1 \times N$  and  $N \times 1$  switches that are, with due respect, entirely different than the  $1 \times N$  and  $N \times 1$  splitter/coupler employed in Applicants' claimed method of Claims 13 and 14 and thus teach away from Applicants' claimed method. Also, the method disclosed by Hung could not be employed with

the splitter/coupler arrangement claimed by Applicants in Claims 13 and 14. Additionally, Applicants note that Claims 13 and 14 depend either directly or indirectly from amended Claim 1, which as Applicants have described above, is taught away from by Hung. Therefore, Applicants contend that Hung teaches away from Claims 13 and 14 and that, for at least this reason, they are not rendered obvious by Hung and Claims 13 and 14 are allowable as written.

With respect to Claims 29 and 30 and in response to the Office Action's specific rejection thereof under 35 U.S.C. §103(a), Applicants note Claim 29 has been amended to claim that the received optical signal includes first and second coherently multiplexed optical signals that each include optical signals offset relative to one another in time and not in phase. Hung's disclosure and use of phase modulation and delay (including the modulo  $2\pi$  and signal-to-noise degradation problems inherent therein) to form a combined optical signal for transmission teaches an entirely different method in a narrow field of art for increasing the data throughput in an optical communication network. Claim 30 depends from Claim 29 and thus includes the steps and limitations of Claim 29 that are taught away from by Hung. For at least these reasons, Applicants argue that Claims 29 and 30 are not rendered obvious by Hung and are allowable.

Regarding Claims 44 and 45 and responsive to the Office Action's rejection thereof under 35 U.S.C. §103(a), Applicants note that Claims 44 and 45 depend directly from amended independent Claim 39 and, therefore, include the steps and limitations thereof. Claim 39 has been amended to claim that each of the output optical signals of the plurality of output optical signals includes a coherently multiplexed plurality of modulated optical signals that are offset in time relative to one another, have the same wavelength, and the same phase. As has been described herein, Hung's disclosure of phase modulation and delay teaches away from the use of time delays between optical signals. Thus, Hung teaches away from amended independent Claim 39 and, hence, away from Claims 44 and 45 for the same reasons. Additionally, Claim 45 claims that an active polarization adjuster with feedback exists in one path of each interferometer. In Hung, element 1503 seems to control the input to both interferometer paths and not just one interferometer path. Thus, Hung again teaches away from Applicants method as claimed in Claim 45. For at least these reasons, Applicants submit that Claims 44 and 45 are not rendered obvious by Hung and are allowable as written.

Fifth, the Office Action rejected Claim 3 under 35 U.S.C. §103(a) “as being unpatentable over Hung (U.S. Patent Application Publication No. 2004/0008989) in view of Gluckstad (U.S. Patent No. 6,011,874).” In response, Applicants respectfully traverse this rejection of Claim 3 and note that Claim 3 depends directly from amended independent Claim 1 and, therefore, includes the steps and limitations of amended Claim 1. Applicants further again note with regard to Hung and as stated in Paragraph 0047 thereof, “the second embodiment utilizes phase modulated and delayed optical signals and defines each optical channel by a wavelength multiplex, a phase delay or coherence multiplex and a frequency multiplex.” Thus, in Hung’s second embodiment, it is the delay between phases of an optical wavelength that seems to be employed with frequency and wavelength multiplexing to form a combined optical signal for transmission. In contrast and as described more fully in reference to amended Claim 1 above, Applicants’ method comprises the time delay and time multiplexing of a plurality of signals to form a combined optical signal that is transmitted on a single optical path. Applicants’ method does not employ phase modulation and delay for this purpose. As a consequence, Hung’s disclosure and use of phase modulation and delay (including the modulo  $2\pi$  and signal-to-noise degradation problems inherent therein) to form a combined optical signal for transmission teaches an entirely different method in a narrow field of art for increasing the data throughput in an optical communication network. Therefore, Hung actually teaches away from Applicants’ better performing, more reliable, less complicated, and less costly method of accomplishing the same task and, hence, does not render Claims 3 obvious under 35 U.S.C. §103(a).

Furthermore, Gluckstad is directed to a method and system for synthesizing a prescribed intensity pattern based on phase contrast imaging. As such, the disclosures of Gluckstad have nothing to do with optical fiber-based communication systems or methods employed in optical fiber-based communication systems as are described in Hung and claimed in Applicants’ method of Claim 3. Therefore, Gluckstad comprises non-analogous art and cannot be used in combination with Hung to maintain the rejection of Claim 3 for obviousness under 35 U.S.C. §103(a). In addition, the use of non-analogous art such as Gluckstad in combination with Hung obviously constitutes impermissible hindsight reconstruction. For these additional reasons, the rejection of Claim 3 is inappropriate, should be removed, and cannot be maintained. In light of



the foregoing, Applicants contend that Claim 3 is not rendered obvious under 35 U.S.C. §103(a) and is allowable as written.

Sixth, the Office Action rejected Claims 4-6 under 35 U.S.C. §103(a) “as being unpatentable over Hung (U.S. Patent Application Publication No. 2004/0008989) in view of Gluckstad (U.S. Patent No. 6,011,874) as applied to claim 3 above, and further in view of Leger et al. (“Leger”) (U.S. Patent No. 5,027,359).” In response, Applicants respectfully traverse this rejection of Claims 4-6 and again note that, as described more fully with respect to Claim 3 above, Gluckstad comprises non-analogous art and cannot be used in combination with Hung to maintain the rejection of Claim 3 and, for that matter, the rejection of Claims 4-6 for obviousness under 35 U.S.C. §103(a). Also, Leger appears to be directed to an apparatus for coherent beam combining of lasers and for lateral mode control, and does not appear to be directed to optical fiber-based communication systems and methods. Thus, Leger seems to comprise non-analogous art and in combination with the non-analogous art of Gluckstad cannot be used in combination with Hung to maintain the rejection of Claims 4-6 for obviousness under 35 U.S.C. §103(a). Additionally, the use of non-analogous art such as Leger and Gluckstad in combination with Hung obviously constitutes impermissible hindsight reconstruction. In addition, Applicants note that Leger appears to disclose the use of a microlens array to produce a coherent output from an incoherent laser diode array and not the use of a microlens array to image from multiple, mutually-coherent outputs (see Claim 1). Thus, Leger seems to address and solve an entirely different problem than that encountered by Applicants or by Hung and, therefore, there would be no motivation to combine Leger with Gluckstad and Hung in a rejection of Claims 4-6 for obviousness. Further, assuming that the combination of Leger, Gluckstad, and Hung were appropriate, Leger still does not disclose the elements missing from Gluckstad and Hung that are necessary to render Claims 4-6 obvious. For at least these reasons, Applicants submit that Claims 4-6 are not rendered obvious under 35 U.S.C. §103(a) and are allowable as written.

Seventh, the Office Action rejected Claim 7 under 35 U.S.C. §103(a) “as being unpatentable over Hung (U.S. Patent Application Publication No. 2004/0008989) in view of Gluckstad (U.S. Patent No. 6,011,874) and further in view of Barlow (U.S. Patent No. 4,401,363).” In response, Applicants respectfully traverse this rejection of Claim 7 and again note that, as described more fully with respect to Claim 3 above, Gluckstad comprises non-

analagous art and cannot be used in combination with Hung to maintain the rejection of Claim 3 and, for that matter, the rejection of Claim 7 for obviousness under 35 U.S.C. §103(a). Also, neither Hung, Gluckstad, nor Barlow appear to disclose, suggest, or provide any motivation for using a phase-locked laser diode array in an optical fiber-based communication system or method. For at least these reasons, the combination of Hung, Gluckstad, and Barlow is impermissible and constitutes hindsight reconstruction, and Applicants contend that Claim 7 is allowable as written.

Eighth, the Office Action rejected Claim 8 under 35 U.S.C. §103(a) “as being unpatentable over Hung (U.S. Patent Application Publication No. 2004/0008989) in view of Gluckstad (U.S. Patent No. 6,011,874) and further in view of Barlow (U.S. Patent No. 4,401,363) as applied to claim 7 above, and further in view of Leger (U.S. Patent No. 5,027,359).” In response, Applicants respectfully traverse this rejection of Claim 8 and again note that, as described more fully with respect to Claim 3 above, Gluckstad comprises non-analagous art and cannot be used in combination with Hung to maintain the rejection of Claim 3 and, for that matter, the rejection of Claim 8 for obviousness under 35 U.S.C. §103(a). Also, neither Hung, Gluckstad, Barlow, nor Leger appear to disclose, suggest, or provide any motivation for using a phase-locked laser diode array in an optical fiber-based communication system or method. For at least these reasons, the combination of Hung, Gluckstad, Barlow, and Leger is impermissible and constitutes hindsight reconstruction, and Applicants contend that Claim 8 is allowable as written.

Ninth, the Office Action rejected Claims 10-12 under 35 U.S.C. §103(a) “as being unpatentable over Hung (U.S. Patent Application Publication No. 2004/0008989) in view of Leger (U.S. Patent No. 5,027,359).” In response, Applicants respectfully traverse this rejection of Claims 10-12 and note that Leger appears to be directed to an apparatus for coherent beam combining of lasers and for lateral mode control, and does not appear to be directed to optical fiber-based communication systems and methods. Thus, Leger seems to comprise non-analagous art and cannot be used in combination with Hung to maintain the rejection of Claims 10-12 for obviousness under 35 U.S.C. §103(a). Additionally, the use of non-analagous art such as Leger in combination with Hung obviously constitutes impermissible hindsight reconstruction. In addition, Applicants note that Leger appears to disclose the use of a microlens

array to produce a coherent output from an incoherent laser diode array and not the use of a microlens array to image from multiple, mutually-coherent outputs (see Claim 1). Thus, Leger seems to address and solve an entirely different problem than that encountered by Applicants or by Hung and, therefore, there would be no motivation to combine Leger with Hung in a rejection of Claims 10-12 for obviousness. Further, assuming that the combination of Leger and Hung were appropriate, Leger still does not disclose or suggest the elements missing from Hung that are necessary to render Claims 10-12 obvious. For at least these reasons, Applicants submit that Claims 10-12 are not rendered obvious under 35 U.S.C. §103(a) and are allowable as written.

Tenth, the Office Action rejected Claims 17 and 19 under 35 U.S.C. §103(a) "as being unpatentable over Hung (U.S. Patent Application Publication No. 2004/0008989) in view of Kartalopoulos ("Introduction to DWDM Technology", IEEE Press, 2000; pages 161-167)." In response, Applicants respectfully traverse this rejection of Claims 17 and 19 and note that, as described above, Hung neither discloses nor renders obvious Claim 1. Also, Applicants note that ASK and PSK optical modulation cannot be employed with Hung's system and methods. Thus, one of ordinary skill in the art would not be inclined, or motivated, to utilize ASK or PSK optical modulation with Hung's system and methods. Since there would have been no motivation to utilize ASK or PSK optical modulation, there would be correspondingly no motivation to combine the disclosures of Hung and Kartalopoulos. In light of the foregoing reasons, Applicants assert that Claims 17 and 19 are not rendered obvious under 35 U.S.C. §103(a) and are allowable as written.

Eleventh, the Office Action rejected Claims 15, 36 and 37 under 35 U.S.C. §103(a) "as being unpatentable over Hung (U.S. Patent Application Publication No. 2004/0008989) in view of Kartalopoulos ("Introduction to DWDM Technology", IEEE Press, 2000; pages 161-167), and further in view of Kowalski (U.S. Patent Application Publication No. 2001/0048538)." In response, Applicants respectfully traverse this rejection of Claims 15, 36 and 37. Applicants note that amended Claim 15 depends from amended independent Claim 1 and by virtue of such dependency, includes all of the steps and limitations of amended Claim 1. Similarly, amended Claim 36 depends from amended independent Claim 29 and by virtue of such dependency, includes all of the steps and limitations of amended Claim 29. As described above with respect to amended Claims 1 and 29, Hung neither discloses nor renders obvious Claims 1 and 29 and,

therefore, the combination of Hung and Kowalski does not render obvious Claims 15 and 36. With regard to Claim 37, Applicants note that heterodyne detection is incompatible with Hung's system and methods. Thus, one of ordinary skill in the art would not be inclined, or motivated, to utilize heterodyne detection with Hung's system and methods. Since there would have been no motivation to utilize heterodyne detection, there would be correspondingly no motivation to combine the disclosures of Hung and Kowalski. For at least these reasons, Applicants assert that Claims 15, 36 and 37 are not rendered obvious under 35 U.S.C. §103(a) and are allowable.

Twelfth, the Office Action rejected Claims 24-28 under 35 U.S.C. §103(a) "as being unpatentable over Hung (U.S. Patent Application Publication No. 2004/0008989) in view of Islam et al. ("Islam") (U.S. Patent Application Publication No. 2002/0131693)." In response, Applicants respectfully traverse this rejection of Claims 24-28. Applicants note that amended Claims 24-27 depend directly or indirectly from amended independent Claim 20 and by virtue of such dependency, include all of the steps and limitations of amended Claim 20 therein. As described above, Claim 20 is not anticipated or rendered obvious by the art of reference. Since Hung does not anticipate or render obvious Claim 20, the combination of Hung and Islam does not render obvious Claims 24-27. Therefore, Applicants submit that Claims 24-27 are allowable as well. In regard to Claim 28, Applicants have canceled Claim 28, without prejudice, thereby reserving Applicants' right to pursue the subject matter of canceled Claim 28 in the future in this or another patent application.

Thirteenth, the Office Action rejected Claims 32, 39-42, 44, 45 and 47-49 under 35 U.S.C. §103(a) "as being unpatentable over Hung (U.S. Patent Application Publication No. 2004/0008989) in view of Kartalopoulos ("Introduction to DWDM Technology", IEEE Press, 2000; pages 161-167), and further in view of Mahon et al. ("Mahon") (U.S. Patent No. 5,477,369)." In response, Applicants respectfully traverse the rejection of Claims 32, 39-42, 44, 45 and 47-49. With respect to Claim 32 and in support of the rejection thereof, the Office Action notes that Mahon discloses "a homodyne receiver for optical signals where the path lengths of the receiver are adapted in conformity with a selected fixed phase difference." However, even though Mahon seems to disclose a homodyne receiver for optical signals, it requires a selected fixed phase difference. In contrast, Applicants claimed method does not require a selected fixed phase difference, thereby rendering Applicants' claimed invention far more flexible in its

operation and rendering Mahon not applicable to Applicants' claimed invention. Thus, there would have been no motivation to one of ordinary skill in the art to combine the teachings of Mahon with those of Hung and Kartalopoulos. Therefore, Applicants submit that Claim 32 is not rendered obvious by the combination of Hung, Kartalopoulos, and Mahon and is allowable as written.

Regarding Claims 39-42, 44, 45 and 47-49, Applicants note that Claims 40-42, 44, 45 and 47-49 depend directly or indirectly from amended independent Claim 39 and, therefore, include all of the steps and limitations thereof. Claim 39 has been amended to claim that each of the output optical signals of the plurality of output optical signals includes a coherently multiplexed plurality of modulated optical signals that are offset in time relative to one another, have the same wavelength, and the same phase. As has been described herein, Hung's disclosure of phase modulation and delay teaches away from the use of time delays between optical signals. Thus, Hung teaches away from amended independent Claim 39 and, hence, amended Claim 39 is not disclosed or rendered obvious by Hung or by the combination of Hung, Kartalopoulos, and Mahon, and is allowable. Similarly, Claims 40-42, 44, 45 and 47-49 are allowable for at least the same reasons.

Also, with regard to Claim 47, Applicants note that heterodyne detection is incompatible with Hung's system and methods. Thus, one of ordinary skill in the art would not be inclined, or motivated, to utilize heterodyne detection with Hung's system and methods. Since there would have been no motivation to utilize heterodyne detection, there would be correspondingly no motivation to combine the disclosures of Hung, Kartalopoulos, and Mahon. For at least these reasons, Applicants further assert that Claim 47 is not rendered obvious under 35 U.S.C. §103(a) and is allowable.

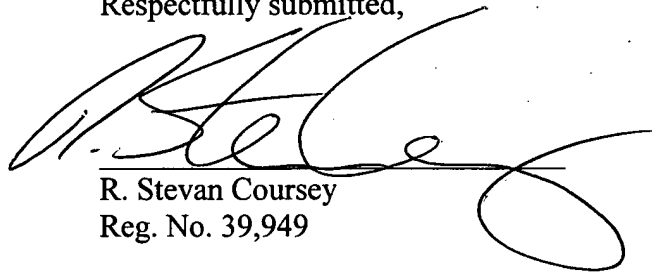
Fourteenth, the Office Action rejected Claim 46 under 35 U.S.C. §103(a) "as being unpatentable over Hung (U.S. Patent Application Publication No. 2004/0008989) in view of Kartalopoulos ("Introduction to DWDM Technology", IEEE Press, 2000; pages 161-167), and further in view of Mahon et al. ("Mahon") (U.S. Patent No. 5,477,369) as applied to claims 32, 39-42, 44, 45 and 47-49 above, and further in view of Kowalski (U.S. Patent Application Publication No. 2001/0048538)." Responsive thereto, Applicants respectfully traverse the rejection of Claim 46 and note that Claim 46 depends directly from amended independent Claim

39 and, therefore, include all of the steps and limitations thereof. Claim 39 has been amended to claim that each of the output optical signals of the plurality of output optical signals includes a coherently multiplexed plurality of modulated optical signals that are offset in time relative to one another, have the same wavelength, and the same phase. As has been described herein, Hung's disclosure of phase modulation and delay teaches away from the use of time delays between optical signals. Thus, Hung teaches away from amended independent Claim 39 and, hence, amended Claim 39 is not disclosed or rendered obvious by Hung or by the combination of Hung, Kartalopoulos, Mahon and Kowalski, and is allowable. Similarly, Claim 46 is allowable for at least the same reasons.

**Conclusion:**

In view of the amendments submitted herein and the above remarks, it is believed that the present patent application has been placed in condition for allowance. Thus, Applicant earnestly solicits early and favorable action. In the event that the Examiner has any questions or requires additional information pertaining to the present patent application, the Examiner is urged to contact Applicant's undersigned attorney.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'R. Stevan Coursey', with a large, stylized flourish extending from the end of the signature.

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